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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,351	10/08/2002	Jiun-Ren Lai	9486-US-PA	3996

31561 7590 06/26/2003

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER

NGUYEN, THINH T

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/065,351

Applicant(s)

LAI ET AL.

Examiner

Thinh T Nguyen

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 02 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-8, 17, 18 and 25-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED OFFICE ACTION

### ***Specification***

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (see MPEP paragraph 606.01).

A title such as -- STRUCTURE OF A MEMORY DEVICE WITH BURIED BIT LINES-- is suggested.

### ***Claim Objections***

2. Claim 8 is objected to for the reason being an improper dependent claim since it is recite as a method claim and it cannot depend on claim 5 which is a device claim..

Applicant is required to cancel the claim or amend it in proper form for examination.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly point out and Distinctly point out the subject matter which the applicant regards as his invention.

4. Claims 4 and 26 are rejected under 35 U.S.C. 112 as being indefinite for the recitation of the phrase " high molecular weight material layer ". This recitation makes the claim indefinite since there are many high molecular materials that can be deposited using PECVD; can

Art Unit: 2818

this material be silicon dioxide or silicon nitride or any compound insulating masking material formed with many metals or any insulating masking material that are heavy ?

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(b/e) that form the basis for the rejections under this section made in this office action.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 1,17 are rejected under 35 U.S.C. 102(b) as being anticipated by Hong (U.S. Patent 6037227).

**REGARDING CLAIM 1**

Hong discloses (in the abstract, in fig 7, fig 8) a buried bit line formed in a substrate of a semiconductor device, comprising a shallow doped region (fig 7 reference 56), disposed in the substrate; a deep doped region (fig 8 reference 60), disposed in the substrate under a part of the shallow doped region, wherein the shallow doped region and the deep doped region together serve as a buried bit line of the memory device;

**REGARDING CLAIM 17**

Hong discloses (in the abstract, in fig 4,fig 7, fig 8, column 1 line 12) a memory device, comprising: a substrate; a gate, disposed on a part of the substrate; a gate oxide layer, disposed

between the substrate and the gate; a shallow doped region, disposed in the substrate beside both sides of the gate; and a deep doped region, disposed in the substrate under a part of the shallow doped region, wherein the shallow doped region and the deep doped region together serve as a buried bit line of the memory device.

*Claim Rejections - 35 USC § 103*

7. The following is a quotation of U.S.C. 103(a) which form the basis for all obviousness rejections set forth in this office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-8, 18, 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong (U.S. patent 6037227) in view of Chan et al. (US patent 6440875) and in view of further remark.

The Examiner note that claim 2, 4, 18, and 27 are products by process claims. In a product-by-process claim, it is the patentability of the claimed product and not of the recited process steps, which must be established. Therefore, when the prior art discloses a product, which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. The Patent Office is not equipped to manufacture products by a myriad of processes put before it and then obtain prior art product and make physical comparisons therewith. In re Brown, 173 USPQ 685 (CCPA

1972). Also, a product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 1 S at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2112.01 and MPEP 2113.

Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear.

#### REGARDING CLAIM 2

Hong et al. disclose all the invention except for the formation of a liner structure on the gate and use the gate spacer as the mask for the second implantation of the buried bit line. Chan et al.; however, disclose a gate liner (fig 6, layer 22a and 22b and column 9 line 30) and use it as a mask when forming the source and drain using implantation.

It would have been obvious to one of ordinary skill in the art the time the invention was made to complement the teachings of Hong with the teachings of Chan et al. in order to fabricate a buried bit line, wherein forming the shallow doped region and the deep doped region comprises: forming a patterned mask layer on a substrate; performing a first doping in the substrate not covered by the mask layer to form the shallow doped region, using the mask layer as a mask; forming a liner layer with a predetermined thickness on at least a side surface of the mask layer; and performing a second doping in the substrate not covered by the mask layer and

the liner layer to form a deep doped region, using the liner layer and the mask layer as a mask.

The rationale is as the following:

A person skilled in the art would have been motivated to improved the structure invented By Hong with the teachings of Chan et al. in order to enhanced the dimensional control as Suggested by Chan et al. in the abstract.

REGARDING CLAIM 3,25

Both Hong (column 4 line 61) and Chan et al. (column 6 lines 17-27) disclose a mask layer that comprises dielectric material. Moreover, The examiner take official notice that the use mask layer comprises a photoresist material, polysilicon or a dielectric material is old and well known in the art.

The reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2

REGARDING CLAIM 4,26

The combined teachings of Hong and Chen et al. disclose all the invention except for The use of a high molecular weight liner layer. The Examiner, however, take Official Notice That the fabrication of a lining insulating layer with high molecular weight has become old and well known in the art and this common knowledge in the art render claims 4 and 26 obvious under Hong in view of Chen et al.

Also, the reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2

REGARDING CLAIM 5

Hong (column 5 line 12-13, line 60) teaches to use implantation energy of approximately 30 to 200 KeV and Chan et al. (column 9 line 15) teach to use implantation energy of approximately 100 to 500 KeV. Moreover, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

The reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2

REGARDING CLAIM 6,7,27,28,29,30

The combined teachings of Hong and Chen et al. disclose all the inventions and although They do not completely go into details about the doping concentration it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

The reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2

REGARDING CLAIM 8

Claim 8 is improper as point out by the Examiner in the Objection at the beginning of the Office Action. However, the examiner assume the Applicant made an error and want to Claim it as a structural device claim as expressed in the communication with the Office on 6/2/2003 (paper no 3), therefore, this claim is examined on its merit as a device claim.

In regard to claim 8, the combined teachings of Hong and Chen et al. disclose all the inventions and although they do not completely go into details about the doping concentration.

Nevertheless, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art since a person skilled will find out the correct concentration through regular experiment.

The reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2.

#### REGARDING CLAIM 18

Hong et al. disclose all the invention except for the formation of a liner structure on the gate and use the gate spacer as the mask for the second implantation of the buried bit line. Chan et al.; however, disclose a gate liner (fig 6, layer 22a and 22b and column 9 line 30) and use it as a mask when forming the source and drain using implantation.

It would have been obvious to one of ordinary skill in the art the time the invention was made to complement the teachings of Hong with the teachings of Chan et al. in order to fabricate) The memory device wherein forming the shallow doped region and the deep doped region further comprises: forming a patterned mask layer on the substrate; performing a first doped region in the substrate not covered by the mask layer to form the shallow doped region; forming a liner layer with predetermined thickness on at least a side surface of the mask layer; and performing a second doped region in the substrate not covered by the liner layer and the mask layer to form a deep doped region.

The reason to combined the teachings of Hong with the teachings of Chen et al. has been presented in the rejection of claims 2.

9. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and the page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

10. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to be abandoned (see M.P.E.P. 710.02(b)).

### CONCLUSION

11. The prior arts made of record and not relied upon are considered pertinent to applicant disclosure: Foote et al. (US patent 6168993) disclose a multiple doped region fabrication in fabrication of electrically-erasable programmable read only memory devices involves implanting ions to form doped region using resist pattern as mask; Hsieh et al. (US patent Application Publication 2003/0013282 A1 disclose a Method for fabricating a shallow ion implanted microelectronic structure ; Wu (US patent Application Publication 2003/0104670) disclose a method for fabricating buried bit lines of a mask rom.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thinh T Nguyen whose phone number is (703) 305-0421. The Examiner can normally be reached on Monday to Friday from 8.30 A.M. to 5.00 P.M.

Art Unit: 2818

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, David C. Nelms can be reached on (703) 308-4910. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

**Thinh T. Nguyen** *TTN*

Art Unit 2818

*HHA*  
**HOAI HO**  
**PRIMARY EXAMINER**